

Title: Concept Development Unit: Patterns And Problem Solving

Patterns on the Move

Brief Overview:

Students will explore patterns using a number of different manipulatives and activities. They will copy, extend and create new repeating patterns. Introduction of the Venn diagram will assist students in discovering a variety of attributes in objects, such as shape, size, and color. Activities will encourage students to apply and connect to their real worlds. Students will learn appropriate math vocabulary to describe their work.

NCTM Content Standard:

Algebra: Understand pattern relations and functions

- Sort, classify, and order objects by size and other properties;
- Recognize, describe, and extend patterns such as sequences of sounds and shapes and translate from one representation to another;
- Analyze how repeating patterns are generated

Grade/Level:

Grade 1

Duration/Length:

4 days (45-60 minutes each day)

Student Outcomes:

Students will:

- Identify, copy, label and extend repeating patterns using colors, shape, size and sound.
- Transfer a repeating pattern from one representation to another using no more than three different objects in the core of the pattern.
- Identify patterns in real life situations.
- Organize data on a Venn diagram.

Materials and Resources:

Resource Sheets - Student (3, 5, 6-9, 12, 13a and b, and 16)

Resource Sheets – Teacher (1, 2, 4, 10, 11, 14, and 15)

Snap cubes

Overhead snap cube tiles

Beep, Beep, Vroom, Vroom by Stuart J. Murphy

Overhead markers

Chart Paper

Pattern blocks

Overhead pattern blocks
Crayons
Pencils
Attribute Blocks
Overhead Attribute Block Tiles
Toy Cars (supplied by students)
Hoola Hoops/ Colored String

Development/Procedures:

Lesson 1

Preassessment – Use the overhead to show an obvious AB repeating pattern using snap cubes. For example red, yellow, red, yellow, red, yellow. Ask the students to identify the pattern. Have another student come up and copy that pattern using the overhead snap cubes. Have students use the yes/no cards to answer if the new pattern is a copy of the previous one. Have another student make a new repeating pattern using the overhead snap cubes. Ask students to answer if this is a repeating pattern by using their yes and no cards (Resource Sheet 1 – Teacher). Discuss what makes a pattern.

Launch – Explain to the students that they are going to be learning about patterns today in math. Distribute five snap cubes of the colors red, yellow and blue to each student. Begin by introducing the story **Beep, Beep, Vroom, Vroom** by Stuart J. Murphy. Ask the students to predict what the story will be about by looking at the front cover. As the story is being read, have the students copy the car patterns using the snap cubes. After each pattern has been created, identify that pattern by asking students, “If you were the dad how would you describe the pattern you made with the cars?” Do this for the remaining patterns that are shown in the story. When the story is finished, go over the three repeating patterns that were copied. Discuss how they are the same and then how they are different.

Teacher Facilitation – Distribute a set of snap cubes to pairs of students. Use two new colors of snap cubes to create a new AB repeating pattern. Show this to the students. Have them copy the pattern using snap cubes. Have students identify the pattern they created by using color words. Ask the students, “If one cube is taken away will this still be a pattern?” Continue to take away cubes one by one and ask students to explain their responses. Develop the definition of a pattern together. You may want to write it on a poster for math vocabulary or a math word wall or a place that students can refer to it during math. Finally, introduce the

vocabulary words: term, core, repeat and together develop definitions for each of these words. You will want to include these words on the math word wall/poster as well. The formal definitions are below:

Pattern- a pattern is a sequence (or order) of objects, numbers, color, etc. that repeats. The core should extend three times when copied by a student

Repeat- something that happens over and over again

Term- a term is each place or position in the sequence

Core- a core of a repeating pattern is the shortest string of elements that repeat

Student Application – Explain to students that they will be making a pattern using only two different colors of snap cubes. The pattern should only consist of four terms in a core and repeat three times. When students are finished, have them pair up with a partner. Their partner will need to identify the repeating pattern using color words. The students will do this one more time. Next, demonstrate how to identify a pattern by using the appropriate math vocabulary learned. For example a pattern with a sequence of red, red, blue, red, red, blue can be described as: *My repeating pattern has 3 terms in a core and uses two colors. It goes red, red, blue, red, red, blue, red, red, blue.*

Embedded Assessment –Use the checklist on Resource Sheet 2-Teacher as you circulate around the classroom to evaluate students as they identify their patterns.

Reteaching/Extension –

- Reteach: Students will copy additional patterns the teacher creates using 2 color counters. Students will verbally describe the given pattern for each example given. As students become proficient in identifying and copying patterns using the two color counters, have them use two colors of snap cubes to copy a pattern or to create a pattern.
- Extension: Students will complete the Student Resource Sheet (Resource Sheet 3-Student) titled **Zooming Patterns**.

Lesson 2

Preassessment – Choose students to create a repeating pattern on the overhead using the snap cube overhead tiles. Choose a different student to identify the repeating pattern verbally. Encourage students to use the vocabulary pattern, term and core.

Launch – As a whole class brainstorm a list of sounds that automobiles make. Have students pick two from the list to use. Here are some examples: Beep, Vroom, Honk, Zoom, and Screech.

Teacher Facilitation – Model a verbal pattern using the two selected sounds in a 2 term core (AB pattern) and assign a visual hand motion for each sound. An example would be “Crash!” while slapping the desk/legs or “Beep” while touching your nose. The pattern will sound like, “Crash!, Beep, Crash!, Beep, Crash!, Beep...” Students will copy the pattern aloud as a group. Then have a student come up to the front of the class and manipulate the sound cards (Resource Sheet 4-Teacher) in the order of the given pattern on the chalkboard or in a pocket chart. Show the students how to label the pattern with letters A and B to describe the sequence. Repeat this activity using a different sequence of sounds to make a new repeating pattern. Have students label the pattern using the terms A and B under the sound cards. Add a third sound and have students manipulate the sound cards and label them as they did for two sounds. Repeat this activity once more.

Student Application – Distribute pattern blocks to the students. Have them make a pattern using 4 terms in the core but using no more than 3 shapes. Remind the students to have their pattern repeat three times. Have students switch places with a partner and verbally label their partner’s pattern using ABC terminology. Then give students Resource Sheet 5- Student **Beep, Beep, Patterns!**

Embedded Assessment – Resource Sheet 5- Student **Beep, Beep, Patterns!**

Homework: Resource Sheet 6 - Student Reteaching/Extension

- Reteach- In preparation for this lesson color each pairs of socks on Resource Sheet 7- Student with a different design and cut them out. Read **A Pair Of Socks** by Stuart J. Murphy. Have students predict what the story might be about by looking at the cover and by taking a picture walk. Before reading, ask the students to tell you why they might be listening to this story and what it has to do with math. (It is going to have patterns in it. It has socks with patterns that might match or they don’t match). Read the story and have students identify the socks that match and why (they had the same pattern). Also ask them to name the pattern they see (red stripe, blue stripe, red stripe, blue stripe) and using the AB terminology. Then have students match the socks found on Resource Sheet 7-Student.

- Extension: Have students design an outfit using matching patterns on Resource Sheet 8-Student. They can choose from making matching socks to matching pants and/or shirts.

Lesson 3

Preassessment – Review proper social behaviors for sharing with the students. Divide the students into groups of three and have them place all the toy cars they've brought with them on the table. Allow time for observation of the toys.

Launch –Distribute two circle mats, Resource Sheet 9-Student, to each group. Ask students to think of a way to make two different groups of cars and place them in the circles. Ask the students to verbalize the reasons behind their car groupings.

Teacher Facilitation – (To do this activity you can either bring in a number of small toy cars that can be grouped by two properties. For example cars that have both colors and designs. Or use the Resource Sheet 10 -Teacher to color and design your own cars). Display two large circles (hoola hoops or string). Ask the students to help you 'park' (sort) the cars into two groups using the circles as your 'parking lots'. Discuss what to do when one car can belong in either circle. For example, if your groups are red cars and striped cars, ask the students if there are any cars that are both red *and* striped. Create a third group of cars that belong in this category outside of the circles. Once all of the cars are parked, ask students to give a description or a title to define each 'parking lot'. Introduce the Venn diagram (using hoops or string) and ask the students what they think that middle area means. Have students now 'park' all the cars into the three circles in the Venn diagram.

Student Application – Distribute one thin attribute block to each student. Display a large chart on the overhead (Resource Sheet 11 - Teacher). Have each student use words to describe their block to the class. Record these descriptions on the chart next to the student's names. Students will mention the color, shape, size, (maybe number of sides) their block has. Write their responses on the chart but do not label the columns. Keep all responses of one type in the same column. For example, column one might have a list of colors; column two might have a list of the different shapes, etc. After the responses are all recorded have students generate appropriate column headings. For example, Color, Shape, and Size. The last and largest column should be used for the location where students have

seen this object in real life. These will be the attributes students will use later to sort their shapes.

Embedded Assessment – Observe and encourage the students to refer to shape, size, and color. Also ask students to think of a place where they have seen this shape before. This is the last column of the chart.

Reteaching/Extension –

- Reteach- Work one on one to encourage the students to verbalize accurately the attributes of different blocks. Refer them to the chart to find the words they need.
- Extend- Prepare five brown bags each with a different attribute block hidden inside. Staple the bag closed with an index card that gives attribute clues for the block inside. For example: Clue#1: The mystery block is red. Clue#2: The mystery block is large. Clue#3: The mystery block is a circle.

Provide markers and paper for the students to draw the block they think is hidden in the bag once they've read all of the clues. Allow them to discover if they've solved the "mystery" by opening the bag and comparing their drawings to the actual block.

Lesson 4

Preassessment- Divide the students into groups. Distribute a set of thin attribute blocks to each group. Ask the students to find a block with a specific attribute. You can challenge students by referring to things other than shape, size, or color. Students should take turns holding up the block. For example: Hold up a block that is large. Do this enough times that each child has at least one turn to hold up a block.

Launch- Refer students to the chart that was completed in lesson 3 Resource Sheet 11 - Teacher. Ask students to choose any two blocks and then hold them up. Ask them to describe what is the same about the two blocks. If there are no overlapping attributes, tell students they may put one down and choose a different block.

Teacher Facilitation- Distribute the Venn diagram mats (Resource Sheet 12- Student) to each pair of students. Ask the students to place only rectangles in the dotted circle. Observe block placements. Then ask students to place only green blocks in the solid line circle. Ask students to see if any of the blocks are both rectangles and green. Review the function of the middle portion of the diagram and tell students to put any blocks that are both rectangles and green in the center. Name the circles and have the students label them accordingly (green and rectangles).

Student Application –Distribute blank Venn diagram mats (Resource Sheet 12- Student) to the groups. You may want to recreate the diagram using two colors or different patterned lines on larger chart paper so the students can comfortably fit the attribute blocks within the circles. Have them discuss with their partners how to group the shapes on the Venn diagram. Instruct students to only choose five blocks each, to place on the diagram. This will limit the activity time and make it easier for them to focus.

Embedded Assessment-Teacher will circulate and ask students to tell how they grouped their blocks. Encourage them to label their diagram. Have students do this twice.

- **Homework-** Using Venn diagrams in a real life situation (Resource Sheet 13a and 13b - Student)

Reteaching/Extension

- Reteach- Give a presorted set of attribute blocks, which clearly divide into two groups, such as rectangles and a specific color. Ask the students to find the blocks for each defining attribute. Guide them to place it in the Venn diagram and to give titles for each part of the diagram.
- Extend-
 1. Add thick attribute blocks to sets the students will use for this activity. Challenge them to create new groupings to include this attribute and use the Venn diagram.
 2. Display a Venn diagram using three circles and place attribute blocks within the diagram. (Resource Sheet 14 - Teacher) Have students come up with names for each circle and the overlapping areas. Place the answers for next to each circle in an envelope. Challenge them to find three additional blocks to place inside the diagram. You can also give them a blank three circle Venn diagram (Resource Sheet 15- Teacher) (use different colors for each circle), or use colored hoops or strings. Ask them to put in their own blocks. You might want them to discover that there is an area outside the Venn diagram where blocks can go if they don't fit into any of the circles.

Summative Assessment:

Students will complete an Assessment Activity (Resource Sheet 16 - Student). They will answer multiple choice questions and draw responses applying their knowledge of patterns and classifying objects based on attributes.

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Teacher Checklist

Student Names	Did the student copy the pattern?	Did the student create a two color pattern?	Could the student clearly describe the pattern?
1.			
2.			
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12.			
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20.			

*Zooming Patterns!*

Directions: Use different colors of snap cubes to make a repeating pattern. You can use up to four terms in the core of the pattern. Color your pattern below and write the letter pattern underneath each square.

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— — — — — — — — — — — — — — —

Beep

Vroom

Honk

Zoom

Screech

Name: _____



Beep, Beep Patterns!

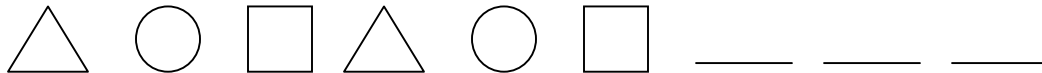


1. Make a pattern in the squares below using two colors.

_____ / _____ / _____ / _____ / _____ / _____ / _____ / _____

2. Label your pattern underneath using the letters A and B.

3. Continue the following pattern you see below and label it using letters.



4. Using ○'s and △'s draw an AAB pattern in the box below.

Name: _____



Beep, Beep Homework!



Please bring to school two or three small toy cars (Matchbox size) that are different. We will be using them in our math lesson. Thanks!

Name: _____



Beep, Beep Homework!



Please bring to school two or three small toy cars (Matchbox size) that are different. We will be using them in our math lesson. Thanks!

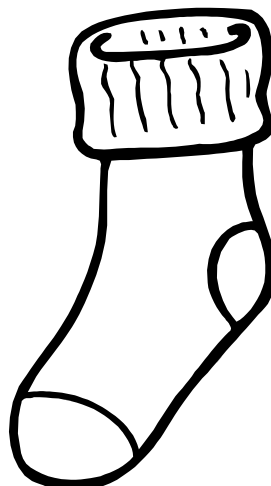
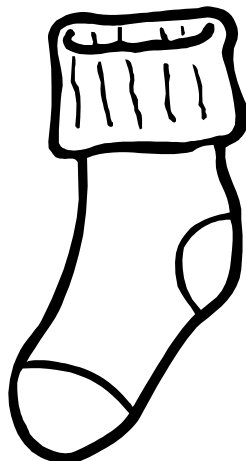
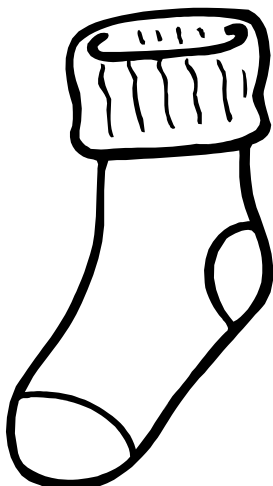
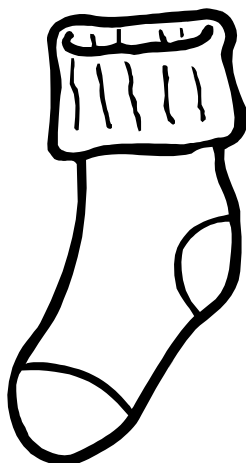
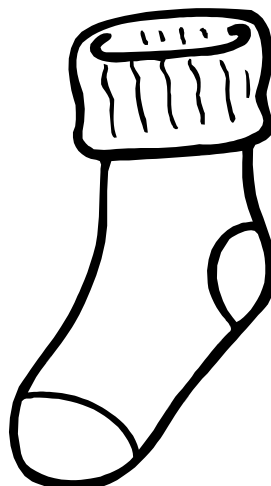
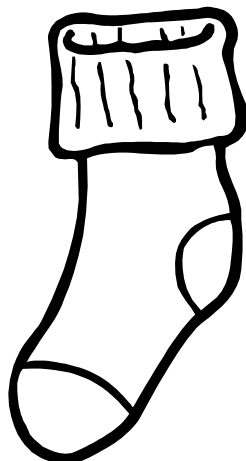
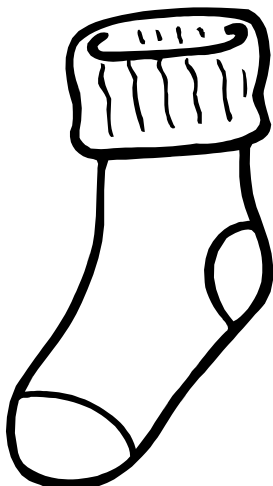
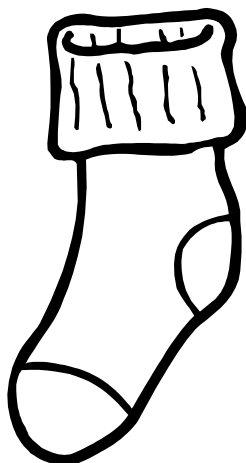
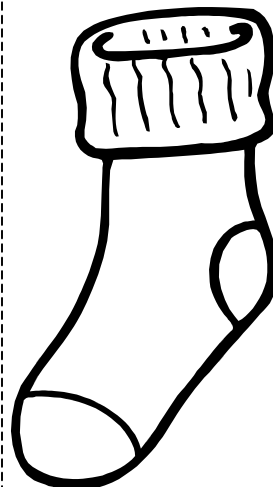
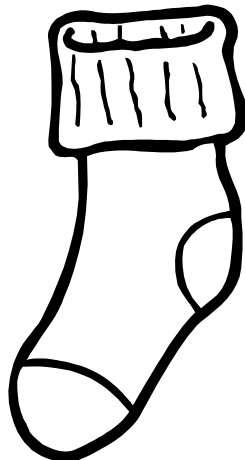
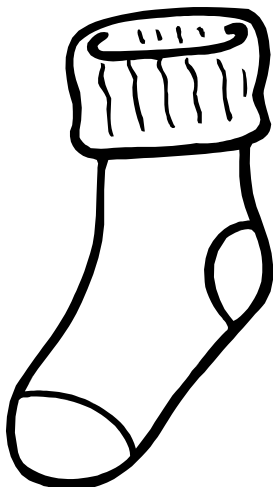
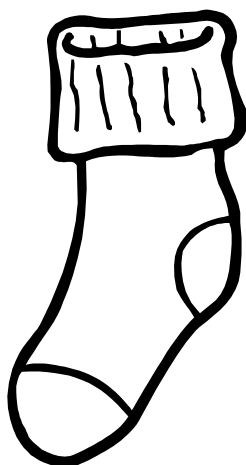
Name: _____

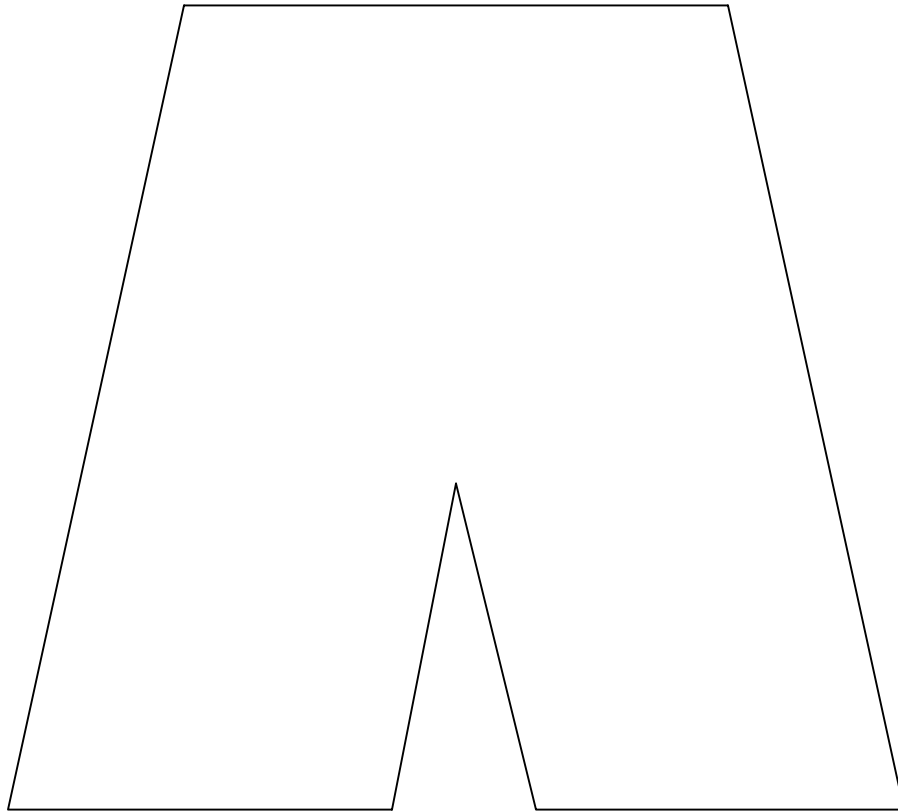
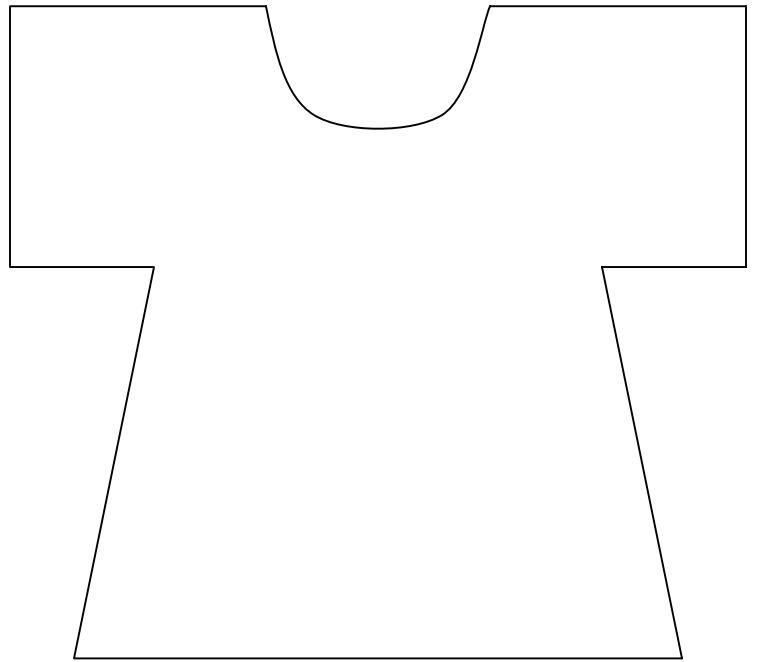
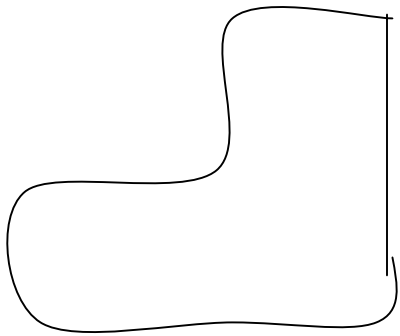
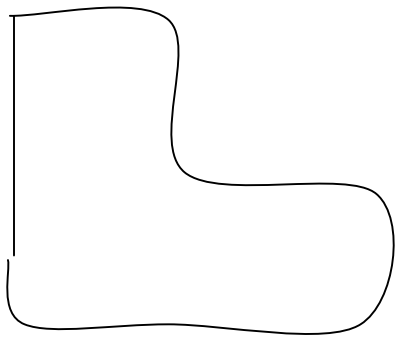


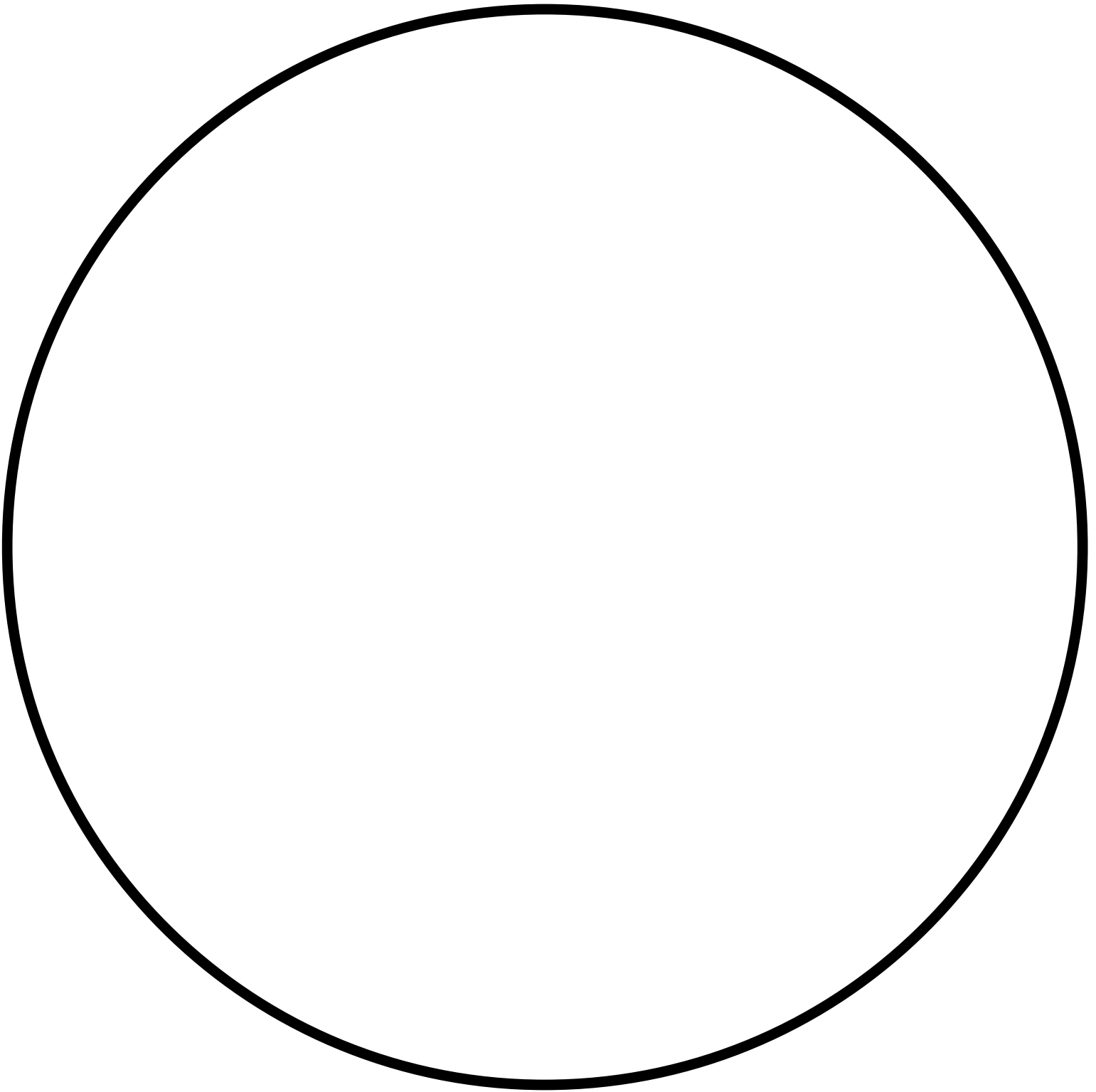
Beep, Beep Homework!

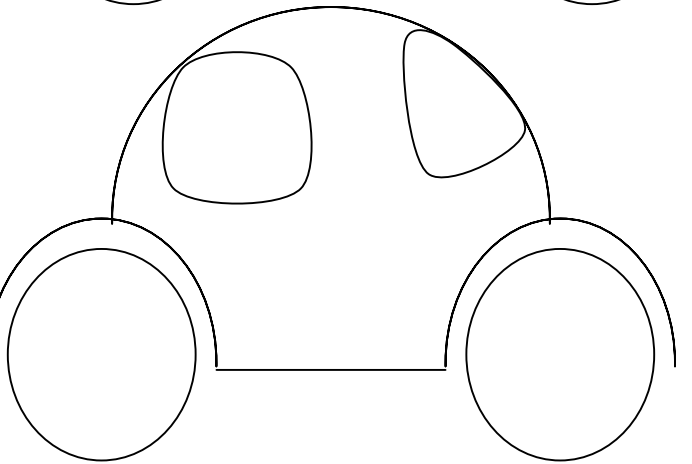
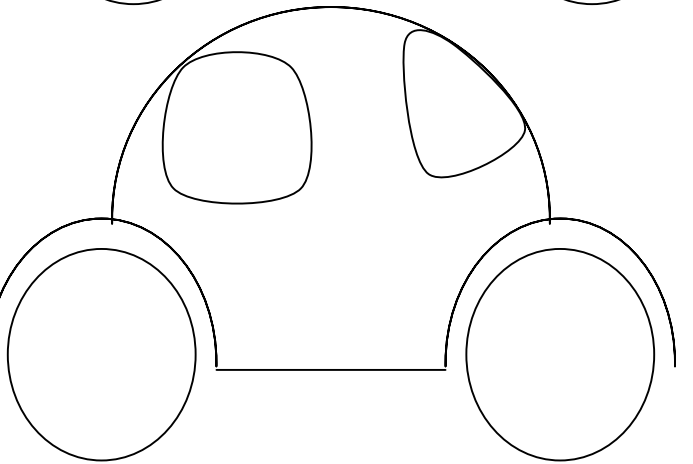
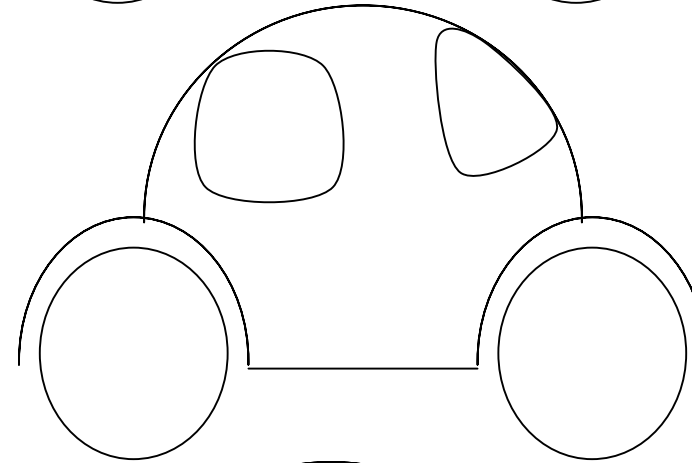
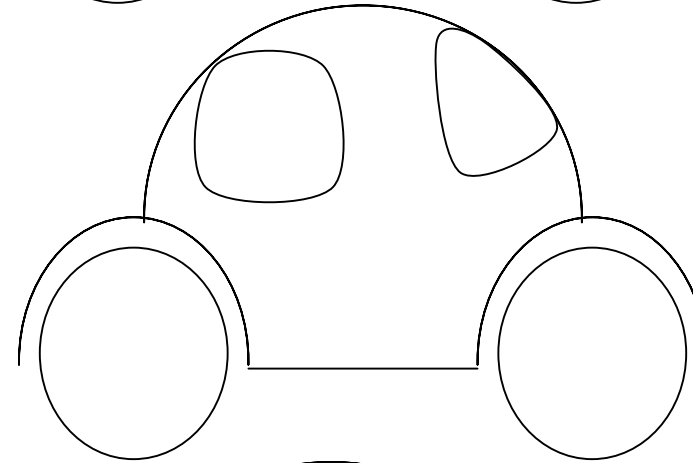
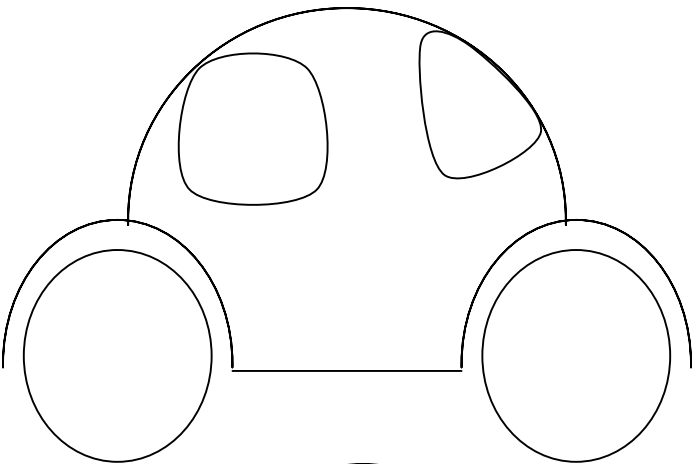
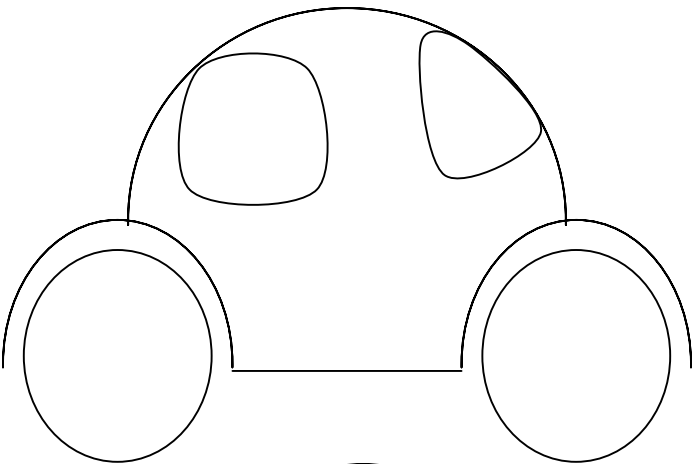
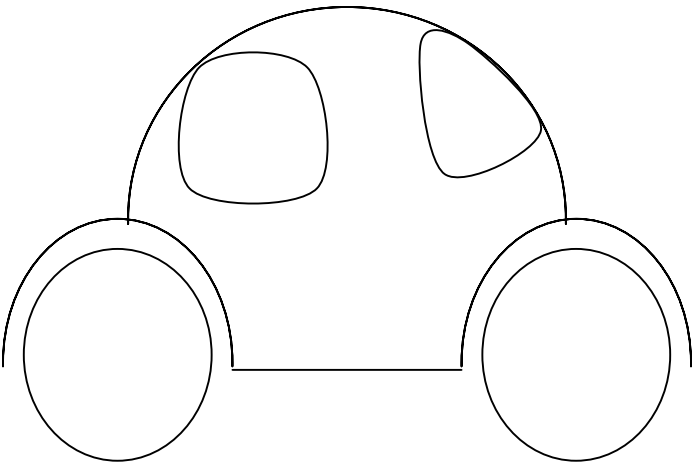
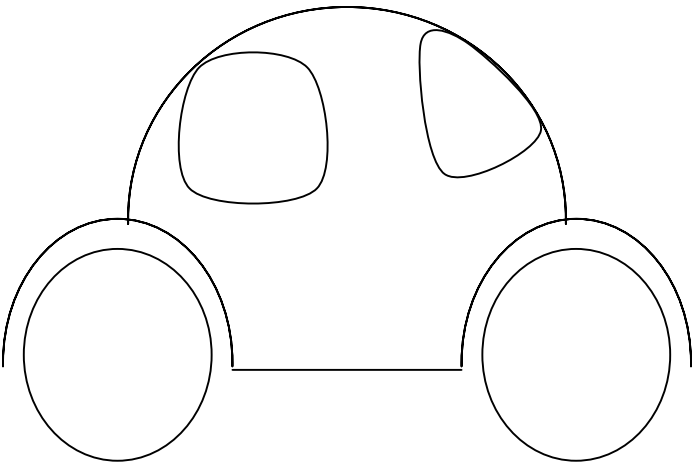


Please bring to school two or three small toy cars (Matchbox size) that are different. We will be using them in our math lesson. Thanks!

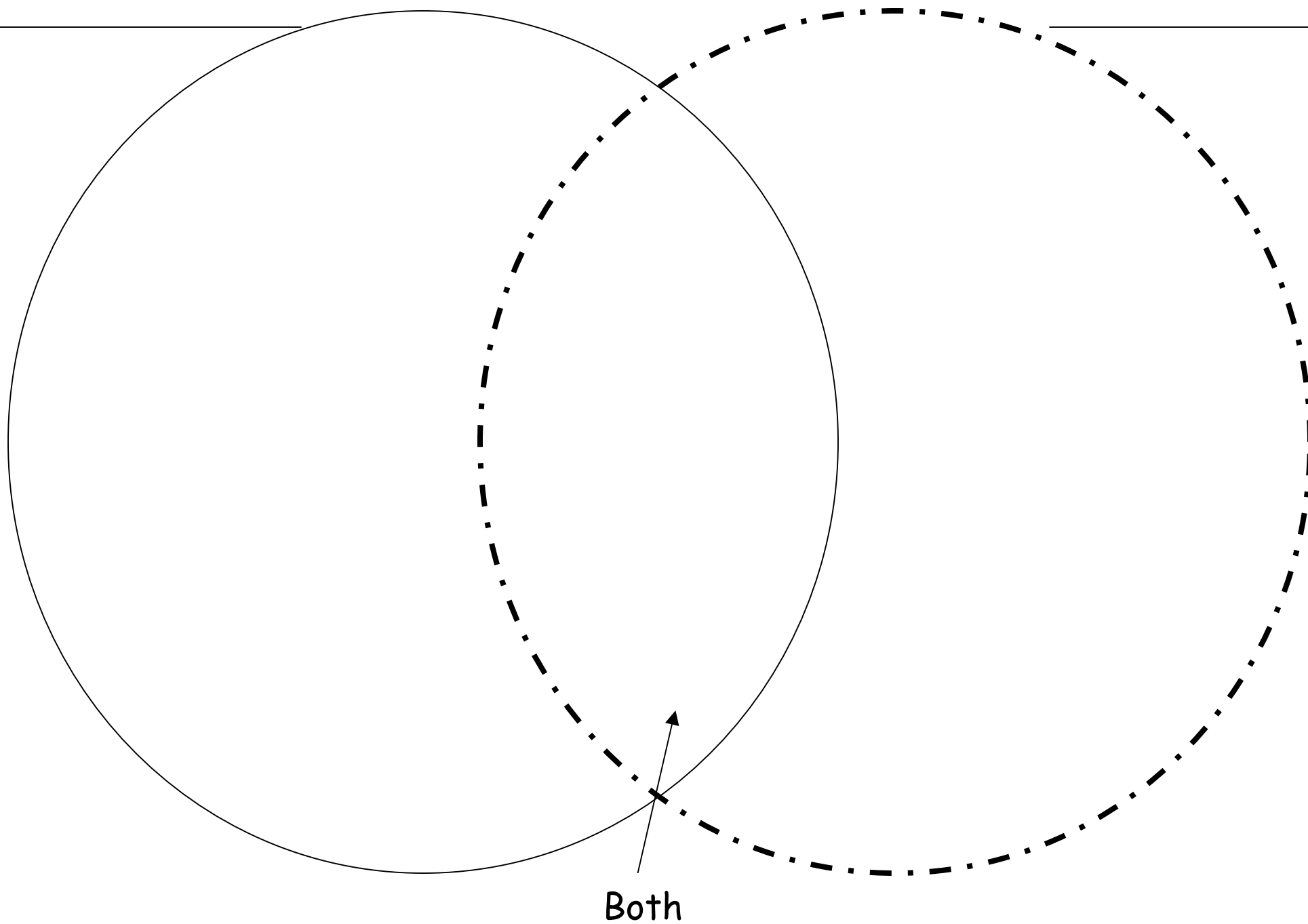








Student Names				
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Name: _____

What Do You Like?

This activity will let you find out something about the foods your friends and family members like.

1. Think of two foods you would like to use and fill in a title for each circle on the Venn diagram sheet.
2. Ask 5-7 people if they like each of the food. (Don't ask them which they like better. Just ask them if they like each food.)
3. On the Venn diagram sheet write the name of the person in the circle of the food that they like. Remember that the middle of the circle should only have the names of the people who like both foods!
4. Answer the questions at the bottom of this sheet when you are done.

Questions

1. How many people did you ask? _____
2. How many people like the food in the solid line circle? _____
3. Who only likes the food in the dotted circle?

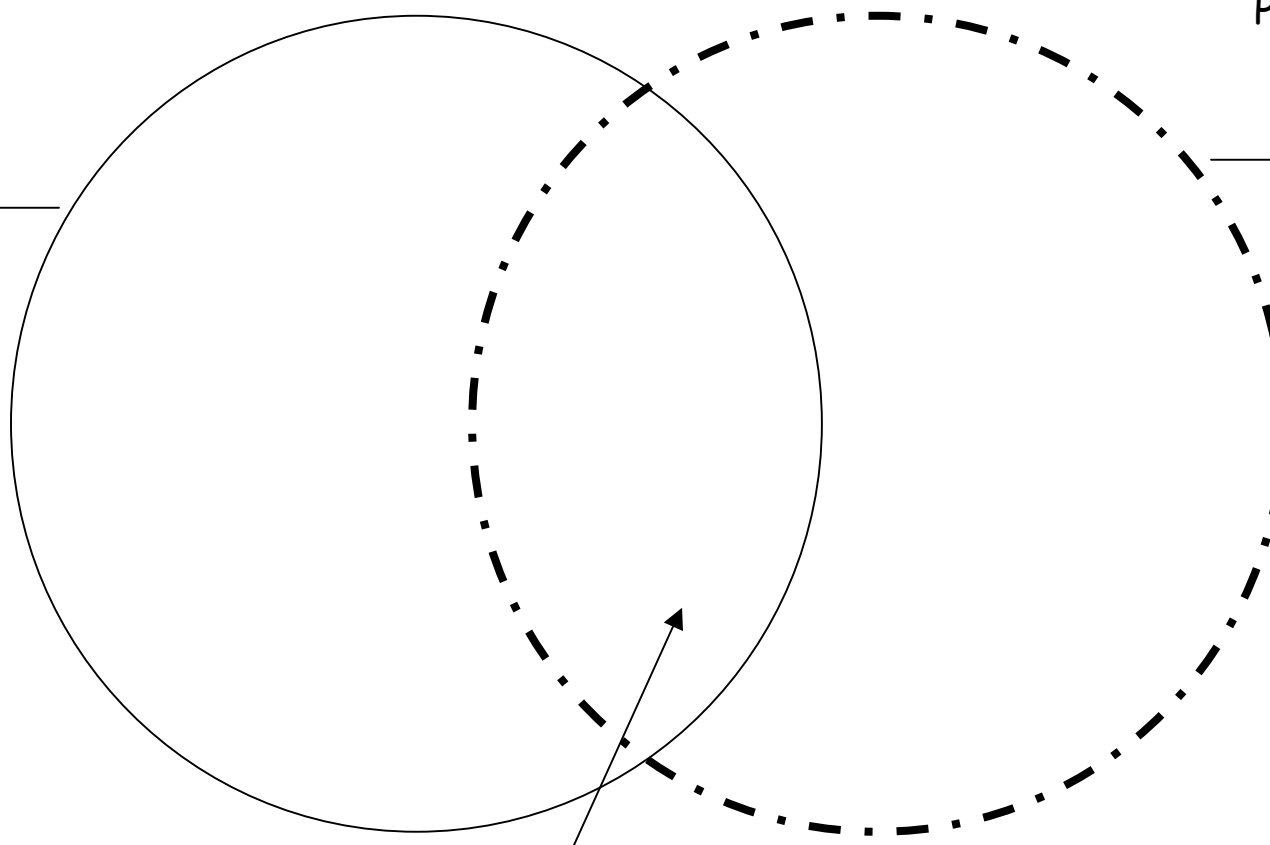
4. How many people like both foods? _____
5. Were there any people who didn't like either food? _____

Name: _____

Venn Diagram- Foods People Like

People who like:

People who like:

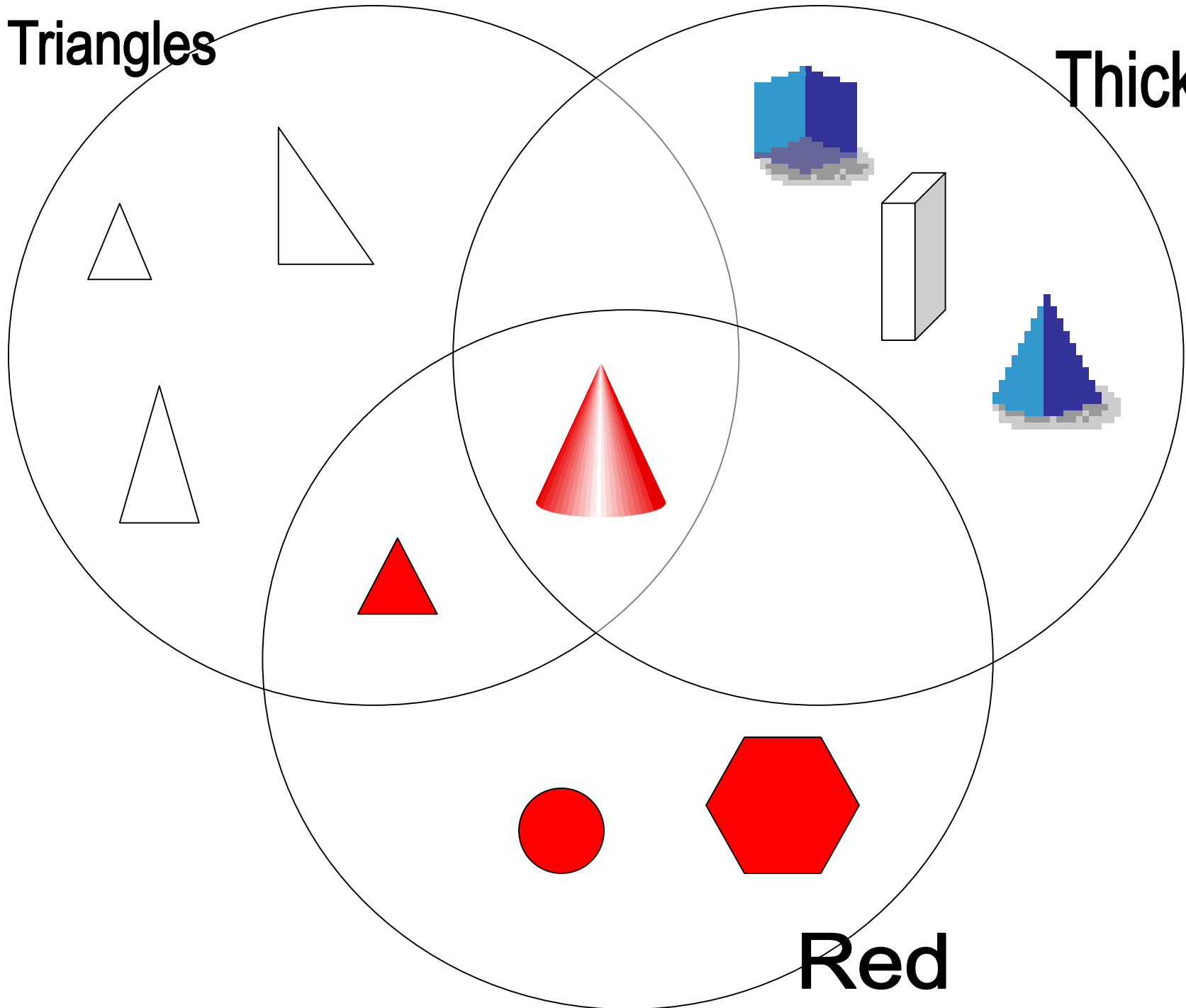


People who like both

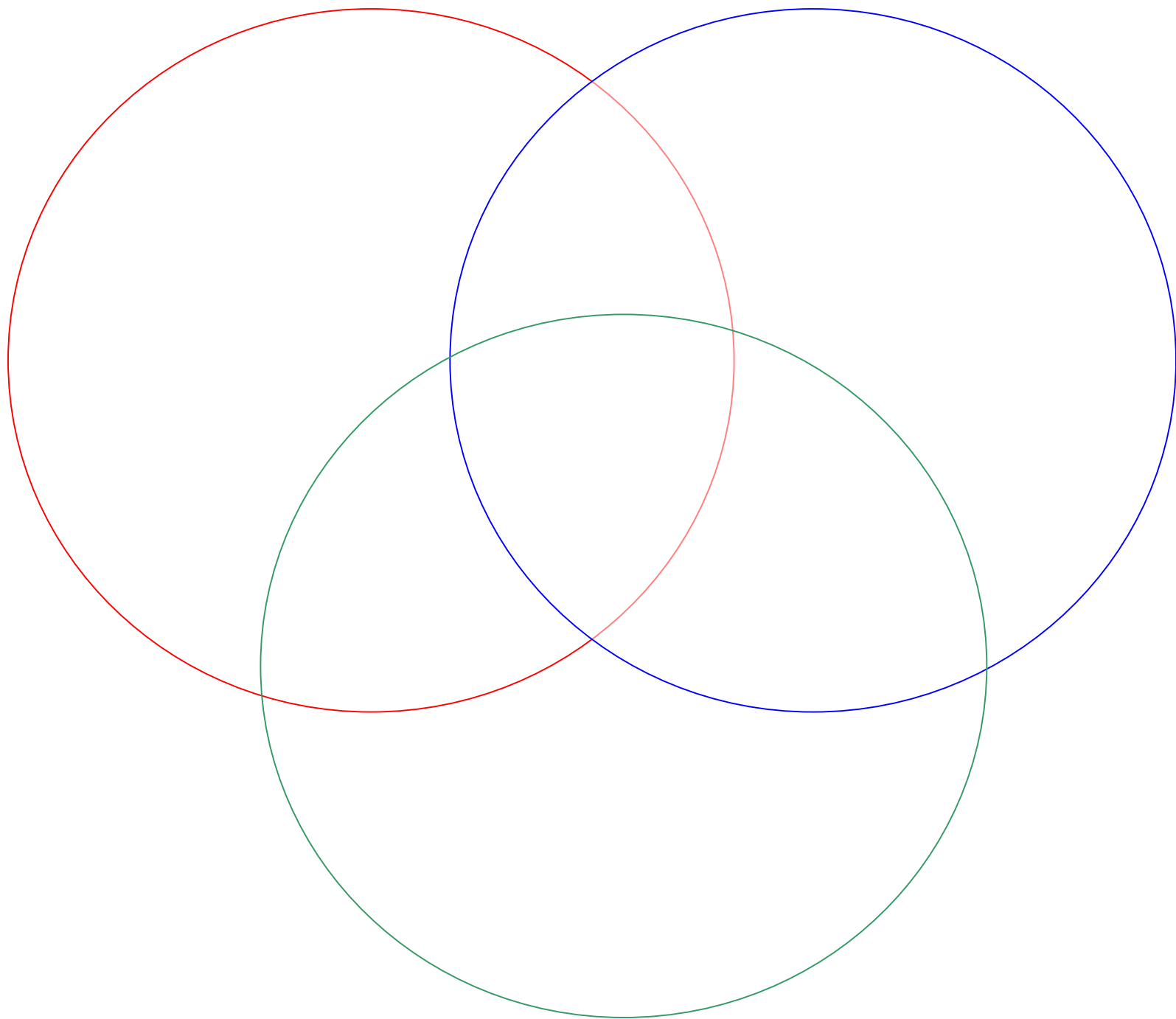
Venn Diagram

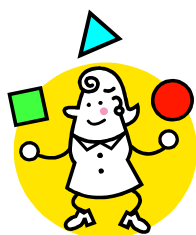
Triangles

Thick

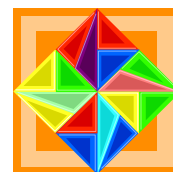


Red

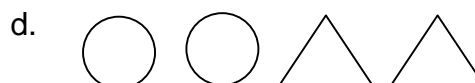
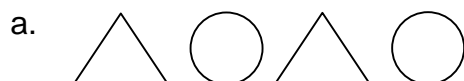




Math Assessment Activity



1. Choose the next four terms.



2. Choose a name for this pattern:



a. ABAB

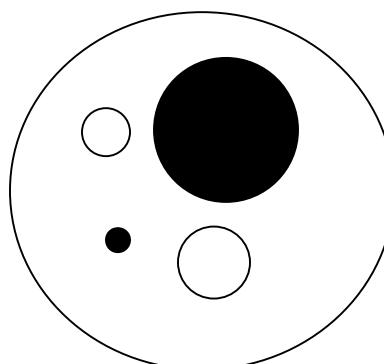
c. AABB

b. ABCABC

d. ABBABB

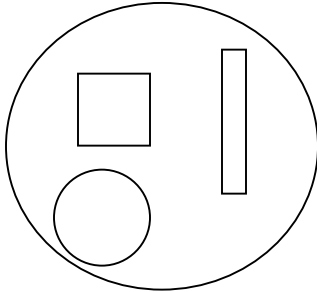
3. What shape belongs with the group in the circle?

- a.
- b.
- c.

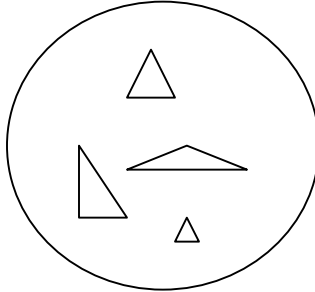


4. Choose a name for this group.

_____ SHAPES



TRIANGLE SHAPES

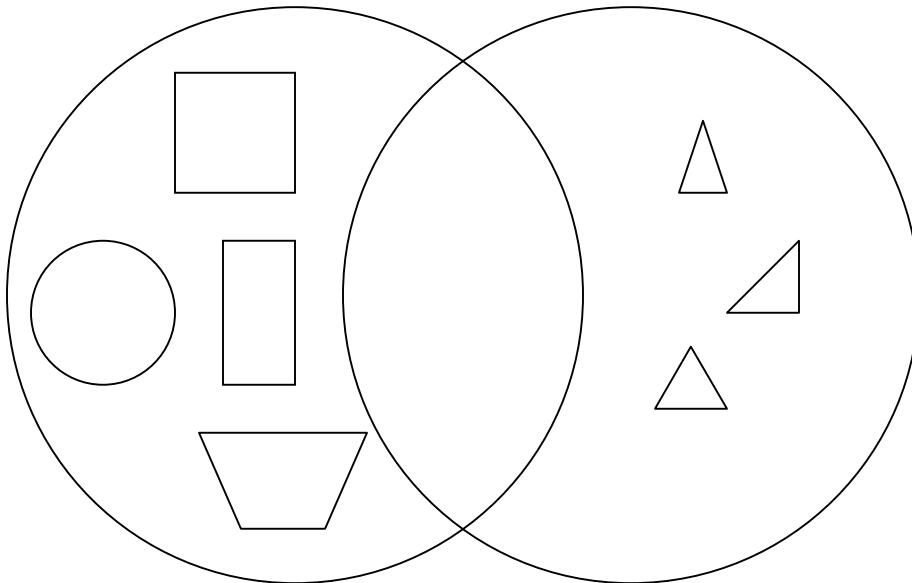


a. big

b. red

c. circle



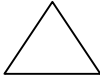

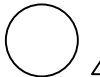

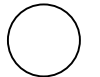


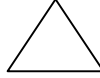






5. Draw a shape that fits in the middle of the Venn diagram.













Math Assessment Activity- Answer Key

1. Choose the next four terms.






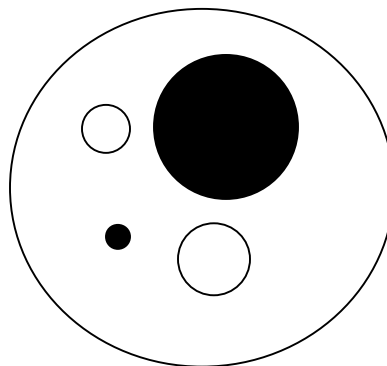
- a.    
- b.    
- c.    
- d.    

2. Choose a name for this pattern:

- a.           ABAB
- b. ABCABC
- c. AABB
- d. ABBABB

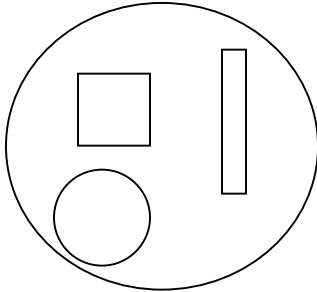
3. What shape belongs with the group in the circle?

- a. 
- b. 
- c. 

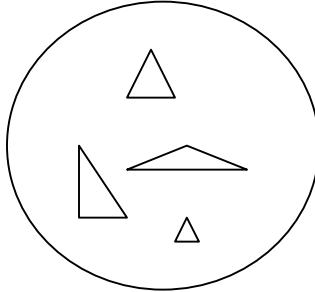


4. Choose a name for this group.

_____ SHAPES



TRIANGLE SHAPES



- a. big
- b. red
- c. circle

5. Draw a shape that fits in the middle of the Venn diagram.

